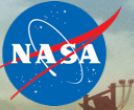


Aviation is Vital to our Nation's Economy



Propulsion Noise: Update on NASA Program Office strategy

Dale Van Zante
AATT Chief Technologist for Propulsion
NASA Glenn Research Center

Acoustics Technical Working Group
April 12-13, 2022
NASA Langley Research Center

Pre-COVID

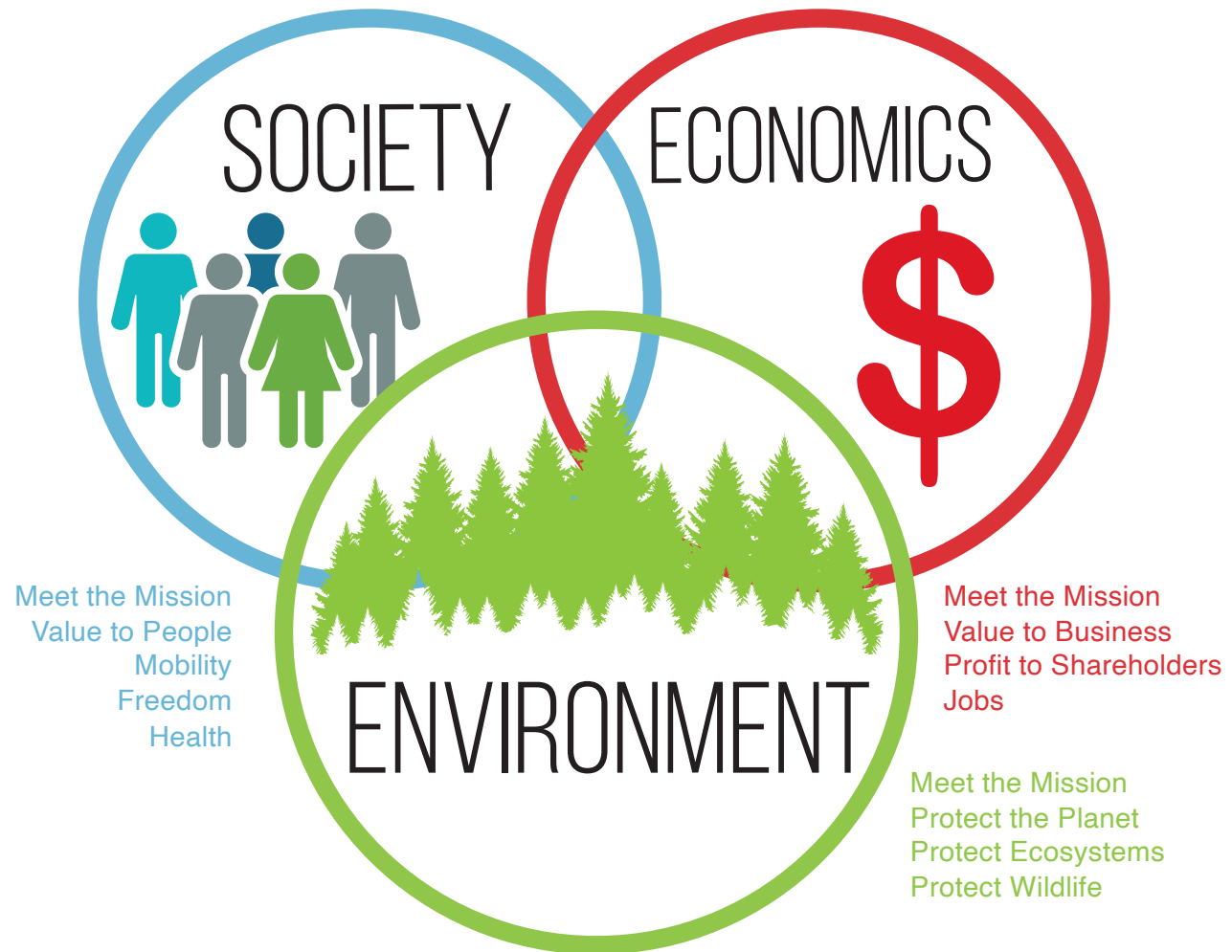
- \$78 billion positive trade balance; the largest positive trade balance of any U.S. manufacturing sector
- \$1.8 trillion total U.S. economic activity
- 10.9 million direct/indirect jobs
- 21.3 billion tons of freight transported by U.S. airlines in 2019

Sustainability – a Global View



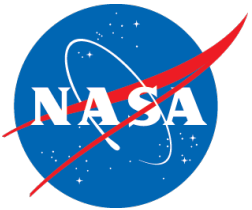
“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

- UN World Commission on Environment and Development



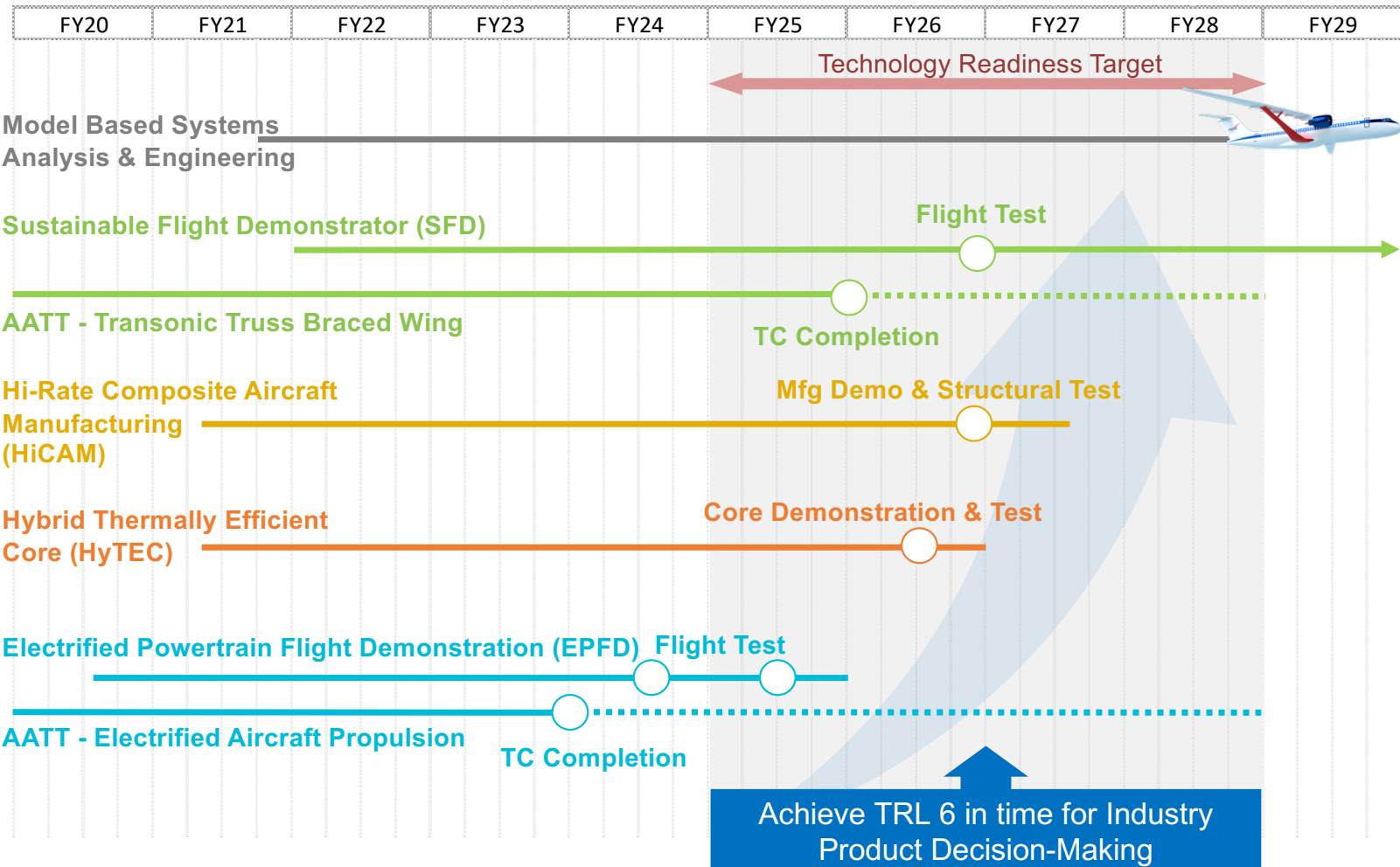
Sustainable Flight National Partnership

Partnership Focus

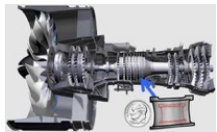


Through advanced vehicle technologies, efficient airline operations and sustainable aviation fuels, collectively we aim to reduce carbon emissions from aviation by half by 2050, compared to 2005, and achieve net-zero emissions by 2060.

Subsonic Transports: Integrated Technology Development



Leverage the Asset – Future Spirals



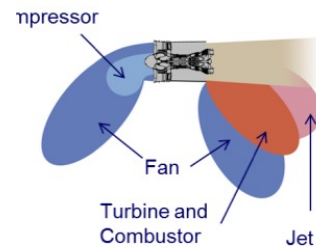
The propulsor 'landscape' for subsonic transport aircraft



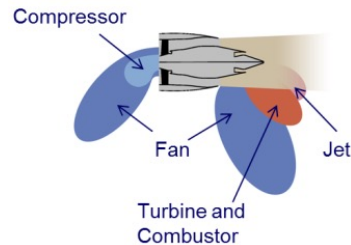
Twin-Aisle
Mach > 0.8

Single-Aisle
Mach ≤ 0.8

Nearer term



Higher thrust and FPR
Balanced forward/aft directivity



Trending to low FPR
Aft fan noise dominant



SFNP Focus

Longer term



Highly distributed?
Electrically driven low FPR?
Distortion induced noise?
Fan-to-fan interaction?

Summary



“Sustainability” is the overarching theme as NASA works towards mid-century environmental goals:

Near term: Sustainable Flight National Partnership (SFNP) for 2030s EIS single-aisle aircraft

Longer term: 2040+ studies as a follow-on to the N+3 studies of a decade ago

The “Fab 4” will be a major focus in the near term as part of SFNP:

But, propulsors (aka, the 5th Beatle) need to be part of the research mix too

Where does noise fit into sustainability?

How should the proposed integrated CO₂/noise regulation impact the NASA portfolio?

References:

Sustainability, April 16, 2020

<https://www.nasa.gov/aero/nextgen-aircraft-design-is-key-to-aviation-sustainability>

Sustainable Flight National Partnership (SFNP), June 2, 2021

<https://www.nasa.gov/aeroresearch/nasa-aims-for-climate-friendly-aviation>